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ABSTRACT

Standardized vocational education course titles and core contents for two courses in Mississippi are provided: general industrial maintenance trades I and II. The first course contains the following units: (1) orientation and leadership activities; (2) safety; (3) blueprint reading; (4) oxyacetylene cutting; (5) preventative maintenance; (6) electricity; and (7) metal repair. The second course contains the following units: (1) safety (review and reinforce); (2) plumbing; (3) rigging and hoisting; (4) unloading, uncrating, and inspection; (5) setting equipment; (6) pumps; (7) gear boxes; and (8) bearings, packings, and seals. Each unit consists of these components: objectives, with core/essential objectives indicated; suggested instructional practices; list of suggested resources; list of evaluation and suggested minimum performance standards, with core/essential objectives indicated; and performance record, with core/essential objectives indicated. A checklist for each course combining all unit performance standards into a single list is included. (NLA)

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STANDARDIZED CURRICULUM

FOR

GENERAL INDUSTRIAL MAINTENANCE TRADES

MISSISSIPPI DEPARTMENT OF EDUCATION

OFFICE OF VOCATIONAL, TECHNICAL

AND ADULT EDUCATION

June 1989

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FOREWORD

This volume is intended to be used in the State of Mississippi as a mechanism for standardizing vocational education course titles and core contents. The need for standardization of curricula was triggered by provisions in the Educational Reform Act of 1982 which mandated:

-- elimination of nearly all currently existing curriculum requirements and development of new curriculum content that is "properly sequenced" and "coordinated";

-- steps to ensure that students master one level of course work before being advanced to the next level and that progression is properly sequenced;

-- a criterion-referenced, state-wide testing program that is built upon an identified set of "basic skills" keyed to student performance in grades 3, 5, 8, and 11;

-- revised graduation requirements that take into account student performance on the basic skills and also on a test of "functional literacy skills"; and

-- a system of accrediting schools that takes into account the performance of districts, schools, and students.

In addition to the mandates of the Educational Reform Act, the Strategic Plan for Vocational and Technical Education in Mississippi also calls for improving the quality of vocational and technical education through the standardization of curricula and the articulation of secondary and postsecondary programs.

Both of these mandates were further reinforced by legislation passed in 1986 which called for the establishment of state-wide "guidelines and procedures for managing an instructional program in the public schools." This legislation calls for instructional management plans containing the following components:

1. a written list of learning objectives for every course for which academic credit is given on students' transcripts (state specified core objectives must be included);

2. suggested instructional practices and resources for the learning objectives;

3. standards for student performance for each learning objective; and

4. systematic procedures for evaluating student performance on the learning objectives.

Specific local district actions regarding the state-wide instructional management plan are also required, namely:

1. The objectives contained in this document are common to all programs in the state. Core objectives are designated with an asterisk. The local district is encouraged to add additional objectives to this listing to meet local needs of students and employers.

2. The local school board must officially adopt the learning objectives as the district's curricula.

3. Pass/fail policies must be based on mastery of learning objectives.

4. Student performance on the learning objectives must be systematically evaluated at least once during the school year.

5. During the school year, records of individual student performance must indicate whether or not the objectives have been mastered. The record must indicate mastery status for each of the objectives tested in the Basic Skills Assessment Program (including functional literacy skills) and must be permanently maintained on all students who do <u>not</u> master the basic and functional literacy skills prior to being tested on them.

6. Each year, information about student performance on learning objectives must be reviewed. Those objectives which students are not mastering must be identified, and a plan must be developed for improving student performance on those objectives.

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GENERAL INDUSTRIAL MAINTENANCE TRADES I

Developed by

Roosevelt Beecham, Clinton
Delbert Huskey, Vicksburg
Nelson Byrd, Laurel

GENERAL INDUSTRIAL MAINTENANCE TRADES I

Unit No.	Title
1	Orientation and Leadership Activities
2	Safety
3	Blueprint Reading
4	Oxyacetylene Cutting
5	Preventive Maintenance
6	Electricity
7	Metal Repair

COURSE: General Industrial Maintenance Trades I 3 days

Unit 1: Orientation and Leadership Activities

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with industrial maintenance with their correct definitions.
*2. List factors concerning the occupational outlook for industrial maintenance technicians.
3. List characteristics of a good industrial maintenance technician.
4. List major skills involved in industrial maintenance.
*5. Complete an employment application.
6. Identify youth organizations related to industrial maintenance.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Source: Siebert, Leo N. Introduction to Industrial Electricity-Electronics. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1981.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match seven of ten terms associated with industrial maintenance with their correct definitions.
*Objective 2: The student will list four of six factors concerning the occupational outlook for industrial maintenance technicians.
Objective 3: The student will list seven of ten characteristics of a good industrial maintenance technician.
Objective 4: The student will list three of four major skills involved in industrial maintenance.
*Objective 5: The student will complete an employment application.
Objective 6: The student will identify youth organizations related to industrial maintenance.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with industrial maintenance with their correct definitions.
_____*2. Listed factors concerning the occupational outlook for industrial maintenance technicians.
_____ 3. Listed characteristics of a good industrial maintenance technician.
_____ 4. Listed major skills involved in industrial maintenance.
_____*5. Completed an employment application.
_____ 6. Identified youth organizations related to industrial maintenance.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 5 days

Unit 2: Safety

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with safety to their correct definitions.
*2. List the colors of the federal safety code and purpose of each.
*3. List personal safety rules.
*4. Identify general shop safety rules.
*5. Match classes of fires to their correct definitions.
*6. Match types of fire extinguishers to their correct uses.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Siebert, Leo N. Introduction to Industrial Electricity-Electronics. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1981.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match three of four terms associated with safety to their correct definitions.
*Objective 2: The student will list five of seven colors of the federal safety code and the purpose of each.
*Objective 3: The student will list four of five personal safety rules.
*Objective 4: The student will identify 16 of 22 general shop safety rules.
*Objective 5: The student will match three of four classes of fires to their correct definitions.
*Objective 6: The student will match three of five types of fire extinguishers to their correct uses.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with safety to their correct definitions.
_____*2. Listed the colors of the federal safety code and purpose.
_____*3. Listed personal safety rules.
_____*4. Identified general shop safety rules.
_____*5. Matched classes of fires to their correct definitions.
_____*6. Matched types of fire extinguishers to their correct uses.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 30 days

Unit 3: Blueprint Reading

Objectives: Upon completion of this unit, the student will:

*1. Match terms related to blueprint reading with their correct definitions.
*2. Identify lines in the alphabet of lines.
*3. Match basic blueprint views with their uses.
4. Identify basic types of pictorial drawings.
*5. Identify parts of the blueprint.
*6. Identify basic welding joints and positions.
*7. Read and interpret a working drawing to specifications.
*8. Make a list of materials needed for a job, from a blueprint to specifications.
*9. Fabricate a job, from a blueprint to specifications.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Sources: Fortney, Clarence and Gregory, Mike. Welding Blueprint and Layout. Stillwater, Oklahoma: The Mid-America Vocational Curriculum Consortium, Inc. 1984.

South, Pamela. Basic Blueprint Reading. Mississippi State, Mississippi: Research and Curriculum Unit for Vocational-Technical Education. 1983.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match four of five terms related to blueprint reading with their correct definitions.
*Objective 2: The student will identify seven of ten lines in the alphabet of lines.
*Objective 3: The student will match four of five basic blueprint views with their uses.
Objective 4: The student will identify three basic types of pictorial drawings.

*Objective 5: The student will identify the two parts of the blueprint.
*Objective 6: The student will identify four of five basic welding joints and positions.
*Objective 7: The student will read and interpret a working drawing to specifications.
*Objective 8: The student will make a list of materials needed for a job, from a blueprint to specifications.
*Objective 9: The student will fabricate a job, from a blueprint to specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms related to blueprint reading with their correct definitions.
_____*2. Identified lines in the alphabet of lines.
_____*3. Matched basic blueprint views with their uses.
_____ 4. Identified basic types of pictorial drawings.
_____*5. Identified parts of the blueprint.
_____*6. Identified basic welding joints and positions.
_____*7. Read and interpreted a working drawing to specifications.
_____*8. Made a list of materials needed for a job, from a blueprint to specifications.
_____*9. Fabricated a job, from a blueprint to specifications.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 20 days

Unit 4: Oxyacetylene Cutting

Objectives: Upon completion of this unit, the student will:

*1. Match terms related to oxyacetylene cutting with their correct definitions.
*2. Identify parts of an oxyacetylene cutting torch.
*3. List rules for tip use.
*4. List steps for properly starting a cut.
*5. List special safety requirements for oxyacetylene cutting.
*6. Set up equipment for oxyacetylene cutting.
*7. Lay out a pattern on mild steel plate and cut pattern to specifications.
8. Cut a hole in mild steel.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Fortney, Clarence and Gregory, Mike. Oxyacetylene Welding and Cutting. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1984.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match three terms related to oxyacetylene cutting with their correct definitions.
*Objective 2: The student will identify seven of nine parts of an oxyacetylene cutting torch.
*Objective 3: The student will list three rules for tip use.
*Objective 4: The student will list three of four steps for properly starting a cut.
*Objective 5: The student will list six of eight special safety requirements for oxyacetylene cutting.
*Objective 6: The student will set up equipment for oxyacetylene cutting.
*Objective 7: The student will lay out a pattern on mild steel plate and cut pattern to specifications.
Objective 8: The student will cut a hole in mild steel.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms related to oxyacetylene cutting with their correct definitions.
_____*2. Identified parts of an oxyacetylene cutting torch.
_____*3. Listed rules for tip use.
_____*4. Listed steps for properly starting a cut.
_____*5. Listed special safety requirements for oxyacetylene cutting.
_____*6. Set up equipment for oxyacetylene cutting.
_____*7. Laid out a pattern on mild steel plate and cut pattern to specifications.
_____ 8. Cut a hole in mild steel.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 20 days

Unit 5: Preventive Maintenance

Objectives: Upon completion of this unit, the student will:

*1. Inspect motor driven belts.
*2. Replace motor driven belts.
*3. Apply belt dressing to motor driven belts.
*4. Inspect motor lubricant and add or change as needed.
*5. Inspect pressure hoses for leaks.
*6. Replace pressure hoses.
*7. Inspect idler pulleys.
*8. Replace idler pulleys.
*9. Adjust idler pulleys.
*10. Clean and lubricate machines and equipment.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will inspect two motor driven belts.
*Objective 2: The student will replace two motor driven belts.
*Objective 3: The student will apply belt dressing to motor driven belts.
*Objective 4: The student will inspect motor lubricant and add or change as needed.
*Objective 5: The student will inspect two pressure hoses for leaks.
*Objective 6: The student will replace pressure hoses.
*Objective 7: The student will inspect two idler pulleys.
*Objective 8: The student will replace idler pulleys.
*Objective 9: The student will adjust idler pulleys.
*Objective 10: The student will clean and lubricate machines and equipment.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Inspected two motor driven belts.
____ *2. Replaced two motor driven belts.
____ *3. Applied belt dressing to motor driven belts.
____ *4. Inspected motor lubricant and added or changed as needed.
____ *5. Inspected pressure hoses for leaks.
____ *6. Replaced pressure hoses.
____ *7. Inspected idler pulleys.
____ *8. Replaced idler pulleys.
____ *9. Adjusted idler pulleys.
____ *10. Cleaned and lubricated machines and equipment.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 40 days

Unit 6: Electricity

Objectives: Upon completion of this unit, the student will:

*1. List electrical safety rules.
*2. List safety rules to follow when using electrical tools.
*3. List major causes of electrical accidents.
4. Match terms associated with hand tools to their correct definitions.
*5. Identify hand tools used in industrial electricity.
6. Set up and use a hacksaw.
7. Cut rigid conduit with a pipe cutter.
8. Ream rigid conduit.
*9. Match terms associated with AC fundamentals to their correct definitions.
*10. Match abbreviations associated with AC fundamentals to their correct definitions.
*11. Identify symbols associated with AC.
*12. Define three-phase power.
*13. Calculate the power to an AC motor.
*14. Measure voltage and current to a single-phase AC motor.
*15. Measure voltage and current to a three-phase AC motor.
*16. Wire a pushbutton control.
*17. Hook up a motor to an electrical three phase power supply.
*18. Hook up a motor to an electrical single phase power supply.
*19. Hook up an automatic motor control station.
*20. Replace motor starter on a electric motor.
*21. Wire a single pole switch.
*22. Wire a three way switch.
*23. Wire an outlet.
*24. Replace circuit breakers.
*25. Replace fuses.
*26. Wire a 120 volt single pole circuit breaker.
*27. Wire a 240 volt double pole circuit breaker.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Siebert, Leo N. Introduction to Industrial Electricity-Electronics. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1981.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will list 9 of 11 electrical safety rules.
*Objective 2: The student will list five of six safety rules to follow when using electrical tools.
*Objective 3: The student will list two major causes of electrical accidents.
*Objective 4: The student will match 12 of 16 terms associated with hand tools to their correct definitions.
*Objective 5: The student will identify 35 of 49 hand tools used in industrial electricity.
Objective 6. The student will set up and use a hacksaw.
Objective 7: The student will cut rigid conduit with a pipe cutter.
Objective 8: The student will ream rigid conduct.
*Objective 9: The student will match 14 of 20 terms associated with AC fundamentals to their correct definitions.
*Objective 10: The student will match 13 of 18 abbreviations associated with AC fundamentals to their correct definitions.
*Objective 11: The student will identify four of five symbols associated with AC.
*Objective 12: The student will define three-phase power.
*Objective 13: The student will calculate the power to an AC motor.
*Objective 14: The student will measure voltage and current to a single-phase AC motor.
*Objective 15: The student will measure voltage and current to a three-phase AC motor.
*Objective 16: The student will wire a pushbutton control.
*Objective 17: The student will hook up a motor to an electrical three phase power supply.
*Objective 18: The student will hook up a motor to an electrical single phase power supply.
*Objective 19: The student will hook up an automatic motor control station.
*Objective 20: The student will replace motor starter on a electric motor.
*Objective 21: The student will wire a single pole switch.
*Objective 22: The student will wire a three way switch.
*Objective 23: The student will wire an outlet.

*Objective 24: The student will replace circuit breakers.
*Objective 25: The student will replace fuses.
*Objective 26: The student will wire a 120 volt single pole circuit breaker.
*Objective 27: The student will wire a 240 volt double pole circuit breaker.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Listed electrical safety rules.
_____*2. Listed safety rules to follow when using electrical tools.
_____*3. Listed major causes of electrical accidents.
_____ 4. Matched terms associated with hand tools to their correct definitions.
_____*5. Identified hand tools used in industrial electricity.
_____ 6. Set up and used a hacksaw.
_____ 7. Cut rigid conduit with a pipe cutter.
_____ 8. Reamed rigid conduit.
_____*9. Matched terms associated with AC fundamentals to their correct definitions.
____*10. Matched abbreviations associated with AC fundamentals to their correct definitions.
____*11. Identified symbols associated with AC.
____*12. Defined three-phase power.
____*13. Calculated the power to an AC motor.
____*14. Measured voltage and current to a single-phase AC motor.
____*15. Measured voltage and current to a three phase AC motor.
____*16. Wired a pushbutton control.
____*17. Hooked up a motor to an electrical three phase power supply.
____*18. Hooked up a motor to an electrical single phase power supply.
____*19. Hooked up an automatic motor control station.
____*20. Replaced motor starter on a electric motor.
____*21. Wired a single pole switch.
____*22. Wired a three way switch.
____*23. Wired an outlet.
____*24. Replaced circuit breakers.
____*25. Replaced fuses.
____*26. Wired a 120 volt single pole circuit breaker.
____*27. Wired a 240 volt double pole circuit breaker.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades I 20 days

Unit 7: Metal Repair

Objectives: Upon completion of this unit, the student will:

*1. Identify repair problems.
*2. Select equipment needed to repair specific problems.
*3. Make repairs with the oxyacetylene rig to specifications.
*4. Make repairs with the shielded metal arc welding outfit to specifications.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Fortney, Clarence and Gregory, Mike. Shielded Metal Arc Welding. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1984.

Fortney, Clarence and Gregory, Mike. Oxyacetylene Welding and Cutting. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1984.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will identify repair problems.
*Objective 2: The student will select equipment needed to repair specific problems.
*Objective 3: The student will make repairs with the oxyacetylene rig to specifications.
*Objective 4: The student will make repairs with the shielded metal arc welding outfit to specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____*1. Identified repair problems.
____*2. Selected equipment needed to repair specific problems.
____*3. Made repairs with the oxyacetylene rig to specifications.

____*4. Made repairs with the shielded metal arc welding outfit to specifications.

*Indicates core/essential objectives

GENERAL INDUSTRIAL MAINTENANCE TRADES II

Developed by

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Delbert Huskey, Vicksburg
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GENERAL INDUSTRIAL MAINTENANCE TRADES II

Unit No.	Title
1	Safety (Review and Reinforce)
2	Plumbing
3	Rigging and Hoisting
4	Unloading, Uncrating and Inspection
5	Setting Equipment
6	Pumps
7	Gear Boxes
8	Bearings, Packings and Seals

COURSE: General Industrial Maintenance Trades II 2 days

Unit 1: Safety (Review and Reinforce)

Objectives: Upon completion of this unit, the student will:

*1. Identify general shop safety rules.
*2. List personal safety rules.
*3. List the colors of the federal safety code and purpose of each.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Siebert, Leo N. Introduction to Industrial Electricity-Electronics. Stillwater, Oklahoma: Curriculum and Instructional Materials Center. 1981.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will identify 16 of 22 general shop safety rules.
*Objective 2: The student will list four of five personal safety rules.
*Objective 3: The student will list five of the seven colors of the federal safety code and the purpose of each.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Listed general shop safety rules.
_____*2. Listed personal safety rules.
_____*3. Listed the colors of the federal safety code and purpose of each.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 40 days

Unit 2: Plumbing

Objectives: Upon completion of this unit, the student will:

1. Match terms associated with plumbing materials to their correct definitions.
*2. Select from a list types of materials used in plumbing pipes.
*3. Select from a list types of pipes used in plumbing.
*4. Match types of copper pipe with their correct identification colors.
*5. Distinguish between black steel and galvanized steel pipe.
6. List advantages and disadvantages of plastic (PVC) pipe.
7. Match materials used to make plumbing fittings with their specific uses, types, and properties.
*8. Identify basic plumbing fittings.
*9. Match terms and definitions associated with plumbing tools.
10. Match types of plumbing tools to their uses.
*11. Cut and thread pipe to specifications.
*12. Sweat copper fittings.
*13. Cut, ream, and join plastic pipe.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Introduction to Plumbing. Stillwater, Oklahoma: The Associated General Contractors of America. 1988.

Barcley, Leroy. Residential Plumbing. Stillwater, Oklahoma: The Mid-America Vocational Curriculum Consortium, Inc. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will match 12 of 16 terms associated with plumbing materials to their correct definitions.
*Objective 2: The student will select from a list of eight, six types of materials used in plumbing pipes.

*Objective 3: The student will select from a list of five, four types of pipes used in plumbing.
*Objective 4: The student will match five of six types of copper pipe with their correct identification colors.
*Objective 5: The student will distinguish between black steel and galvanized steel pipe.
Objective 6: The student will list three of four advantages and two disadvantages of plastic (PVC) pipe.
Objective 7: The student will match four of six materials used to make plumbing fittings with their specific uses, types, and properties.
*Objective 8: The student will identify nine of 12 basic plumbing fittings.
*Objective 9: The student will match nine of 12 terms and definitions associated with plumbing tools.
Objective 10: The student will match 28 of 40 types of plumbing tools to their uses.
*Objective 11: The student will cut and thread pipe to specifications.
*Objective 12: The student will sweat copper fittings.
*Objective 13: The student will cut, ream, and join plastic pipe.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Matched terms associated with plumbing materials to their correct definitions.
____ *2. Selected from a list types of materials used in plumbing pipes.
____ *3. Selected from a list types of pipes used in plumbing.
____ *4. Matched types of copper pipe with their correct identification colors.
____ *5. Distinguished between black steel and galvanized steel pipe.
____ 6. Listed advantages and disadvantages of plastic (PVC) pipe.
____ 7. Matched materials used to make plumbing fittings with their specific uses, types and properties.
____ *8. Identified basic plumbing fittings.
____ *9. Matched terms and definitions associated with plumbing tools.
____ 10. Matched types of plumbing tools to their uses.
____ *11. Cut and threaded pipe to specifications.

____*12. Sweated copper fittings.
____*13. Cut, reamed, and joined plastic pipe.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 5 days

Unit 3: Rigging and Hoisting

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with rigging and hoisting to their correct definitions.
*2. Identify types of hand signals.
*3. Identify accessories used for load lifting.
*4. Identify hitches used for attaching materials and equipment to the hoist.
*5. Identify types of knots used in rigging.
*6. List safety tips related to rigging and hoisting.
*7. Describe a safety latch.
*8. Change out motor using portable hoist.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match 18 of 25 terms associated with rigging and hoisting to their correct definitions.
*Objective 2: The student will identify 10 of 13 types of hand signals.
*Objective 3: The student will identify five of six accessories used for load lifting.
*Objective 4: The student will identify the two hitches used for attaching materials and equipment to the hoist.
*Objective 5: The student will identify seven of ten types of knots used in rigging.
*Objective 6: The student will list six of eight safety tips related to rigging and hoisting.
*Objective 7: The student will describe a safety latch.
*Objective 8: The student will change out motor using portable hoist.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with rigging and hoisting to their correct definitions.
_____*2. Identified types of hand signals.
_____*3. Identified accessories used for load lifting.
_____*4. Identified hitches used for attaching materials and equipment to the hoist.
_____*5. Identified types of knots used in rigging.
_____*6. Listed safety tips related to rigging and hoisting.
_____*7. Described a safety latch.
_____*8. Changed out motor using portable hoist.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 3 days

Unit 4: Unloading, Uncrating, and Inspection

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with unloading, uncrating, and inspection.
*2. List steps to take to prevent damage when unloading equipment.
*3. List steps to take after equipment has been unloaded.
*4. List items to look for when receiving equipment.
*5. Unload equipment using hoist.
*6. Uncrate materials as specified.
*7. Inspect equipment or materials for shipping damage as specified.
*8. Inventory shipping list as specified.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define three of four terms associated with unloading, uncrating and inspection.
*Objective 2: The student will list three of four steps to take to prevent damage when unloading equipment.
*Objective 3: The student will list five of seven steps to take after equipment has been unloaded.
*Objective 4: The student will list five of six items to look for when receiving equipment.
*Objective 5: The student will unload equipment using hoist.
*Objective 6: The student will uncrate materials as specified.
*Objective 7: The student will inspect equipment or materials for shipping damage as specified.
*Objective 8: The student will inventory shipping list as specified.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____ 1. Defined terms associated with unloading, uncrating and inspection.
_____*2. Listed steps to take to prevent damage when unloading equipment.
_____*3. Listed steps to take after equipment has been unloaded.
_____*4. Listed items to look for when receiving equipment.
_____*5. Unloaded equipment using hoist.
_____*6. Uncrated materials as specified.
_____*7. Inspected equipment or materials for shipping damage as specified.
_____*8. Inventoried shipping list as specified.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 20 days

Unit 5: Setting Equipment

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with setting equipment to their proper definitions.
*2. List uses of anchor bolts and bedplates when securing equipment.
*3. List vibration and noise control materials.
*4. Identify types of machine mounts.
5. Explain the purpose of machine mounts.
*6. Explain what is usually the most important operation in machinery installation.
*7. Set electrical motor to specifications.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match nine of 12 terms associated with setting equipment to their proper definitions.
*Objective 2: The student will list uses of anchor bolts and bedplates when securing equipment.
*Objective 3: The student will list three of four vibration and noise control materials.
*Objective 4: The student will identify three of four types of machine mounts.
Objective 5: The student will explain the purpose of machine mounts.
*Objective 6: The student will explain what is usually the most important operation in machinery installation.
*Objective 7: The student will set electrical motor to specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with setting equipment to their proper definitions.
_____*2. Listed uses of anchor bolts and bedplates when securing equipment.
_____*3. Listed vibration and noise control materials.
_____*4. Identified types of machine mounts.
_____ 5. Explained the purpose of machine mounts.
_____*6. Explained what is usually the most important operation in machinery installation.
_____*7. Set electrical motor to specifications.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 30 days

Unit 6: Pumps

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with pumps to their correct definitions.
2. List types of pumps.
3. List standard pump ratings in general use.
4. List types of anchors used for pump installation.
*5. List steps to follow when installing a pump.
*6. Match terms associated with compressors to their correct definitions.
*7. List steps to follow when installing a compressor.
*8. Set, align, and level a compressor.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match nine of 12 terms associated with pumps to their correct definitions.
Objective 2: The student will list six of seven types of pumps.
Objective 3: The student will list the two standard pump ratings in general use.
Objective 4: The student will list three of four types of anchors used for pump installation.
*Objective 5: The student will list ten of twelve steps to follow when installing a pump.
*Objective 6: The student will match seven of nine terms associated with compressors to their correct definitions.
*Objective 7: The student will list seven of nine steps to follow when installing a compressor.
*Objective 8: The student will set, align, and level a compressor.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with pumps to their correct definitions.
_____ 2. Listed types of pumps.
_____ 3. Listed standard pump ratings in general use.
_____ 4. Listed types of anchors used for pump installation.
_____*5. Listed steps to follow when installing a pump.
_____*6. Matched terms associated with compressors to their correct definitions.
_____*7. Listed steps to follow when installing a compressor.
_____*8. Set, aligned, and leveled a compressor.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 30 days

Unit 7: Gear Boxes

Objectives: Upon completion of this unit, the student will:

*1. Match terms associated with gear boxes and speed reducers to their correct definitions.
*2. Identify basic types of gear boxes and speed reducers.
*3. List uses of variable speed drives.
*4. Identify types of lubricators.
*5. Disassemble gear box.
*6. Clean gear drives.
*7. Reassemble gear box.
*8. Lubricate gear box.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match four of five terms associated with gear boxes and speed reducers to their correct definitions.
*Objective 2: The student will identify seven of ten basic types of gear boxes and speed reducers.
*Objective 3: The student will list five of six uses of variable speed drives.
*Objective 4: The student will identify 11 of 15 types of lubricators.
*Objective 5: The student will disassemble gear box.
*Objective 6: The student will clean gear drives.
*Objective 7: The student will reassemble gear box.
*Objective 8: The student will lubricate gear box.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with gear boxes and speed reducers to their correct definitions.
_____*2. Identified basic types of gear boxes and speed reducers.
_____*3. Listed uses of variable speed drives.
_____*4. Identified types of lubricators.
_____*5. Diassembled gear box.
_____*6. Cleaned gear drive.
_____*7. Reassembled gear box.
_____*8. Lubricated gear box.

*Indicates core/essential objectives

COURSE: General Industrial Maintenance Trades II 10 days

Unit 8: Bearings, Packings, and Seals

Objectives: Upon completion of this unit, the student will

*1. Match terms associated with bearings, packings, and seals to their correct definitions.
*2. Identify types of bearings.
3. List types of bearing materials.
*4. List reasons for bearing failure.
*5. Remove bearings as specified.
*6. Pack bearings to specifications.
*7. Replace bearings to specifications.
*8. Replace seal to specifications.

*Indicates core/essential objectives

Suggested Instructional Practices:

Lecture, discussion, and practical application

Suggested Resources:

Primary Source: Hendrix, Laborn J. Industrial Mechanical Maintenance. Stillwater, Oklahoma: The Associated General Contractors of America. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will match 14 of 20 terms associated with bearings, packings, and seals to their correct definitions.
*Objective 2: The student will identify 7 of 9 types of bearings.
Objective 3: The student will list 5 of 7 types of bearing materials.
*Objective 4: The student will list 7 of 10 reasons for bearing failure.
*Objective 5: The student will remove bearings as specified.
*Objective 6: The student will pack bearings to specifications.
*Objective 7: The student will replace bearings to specifications.
*Objective 8: The student will replace seal to specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

_____*1. Matched terms associated with bearings, packings, and seals to their correct definitions.
_____*2. Identified types of bearings.
_____ 3. Listed types of bearing materials.
_____*4. Listed reasons for bearing failure.
_____*5. Removed bearings as specified.
_____*6. Packed bearings to specifications.
_____*7. Replaced bearings to specifications.
_____*8. Replaced seal to specifications.

*Indicates core/essential objectives

STUDENT PERFORMANCE RECORD

GENERAL INDUSTRIAL MAINTENANCE TRADES

GENERAL INDUSTRIAL MAINTENANCE TRADES I

Student: _____

This record is provided as an alternative to the student performance records at the end of each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

Place a check by each objective the student achieved; you may wish to note the date that the student achieved the objective.

C = Core competencies.

____ C1. Matched terms associated with industrial maintenance with their correct definitions.
____ C2. Listed factors concerning the occupational outlook for industrial maintenance technicians.
____ 3. Listed characteristics of a good industrial maintenance technician.
____ 4. Listed major skills involved in industrial maintenance.
____ C5. Completed an employment application.
____ 6. Identified youth organizations related to industrial maintenance.
____ C7. Matched terms associated with safety to their correct definitions.
____ C8. Listed the colors of the federal safety code and purpose.
____ C9. Listed personal safety rules.
____ C10. Identified general shop safety rules.
____ C11. Matched classes of fires to their correct definitions.
____ C12. Matched types of fire extinguishers to their correct uses.
____ C13. Matched terms related to blueprint reading with their correct definitions.
____ C14. Identified lines in the alphabet of lines.
____ C15. Matched basic blueprint views with their uses.
____ 16. Identified basic types of pictorial drawings.
____ C17. Identified parts of the blueprint.
____ C18. Identified basic welding joints and positions.
____ C19. Read and interpreted a working drawing to specifications.
____ C20. Made a list of materials needed for a job, from a blueprint to specifications.
____ C21. Fabricated a job, from a blueprint to specifications.
____ C22. Matched terms related to oxyacetylene cutting with their correct definitions.
____ C23. Identified parts of an oxyacetylene cutting torch.

____C24. Listed rules for tip use.
____C25. Listed steps for properly starting a cut.
____C26. Listed special safety requirements for oxyacetylene cutting.
____C27. Set up equipment for oxyacetylene cutting.
____C28. Laid out a pattern on mild steel plate and cut pattern to specifications.
____ 29. Cut a hole in mild steel.
____C30. Inspected two motor driven belts.
____C31. Replaced two motor driven belts.
____C32. Applied belt dressing to motor driven belts.
____C33. Inspected motor lubricant and added or changed as needed.
____C34. Inspected pressure hoses for leaks.
____C35. Replaced pressure hoses.
____C36. Inspected idler pulleys.
____C37. Replaced idler pulleys.
____C38. Adjusted idler pulleys.
____C40. Cleaned and lubricated machines and equipment.
____C41. Listed electrical safety rules.
____C42. Listed safety rules to follow when using electrical tools.
____C43. Listed major causes of electrical accidents.
____ 44. Matched terms associated with hand tools to their correct definitions.
____C45. Identified hand tools used in industrial electricity.
____ 46. Set up and used a hacksaw.
____ 47. Cut rigid conduit with a pipe cutter.
____ 48. Reamed rigid conduit.
____C49. Matched terms associated with AC fundamentals to their correct definitions.
____C50. Matched abbreviations associated with AC fundamentals to their correct definitions.
____C51. Identified symbols associated with AC.
____C52. Defined three-phase power.
____C53. Calculated the power to an AC motor.
____C54. Measured voltage and current to a single-phase AC motor.
____C55. Measured voltage and current to a three phase AC motor.
____C56. Wired a pushbutton control.
____C57. Hooked up a motor to an electrical three phase power supply.
____C58. Hooked up a motor to an electrical single phase power supply.
____C59. Hooked up an automatic motor control station.
____C60. Replaced motor starter on a electric motor.
____C61. Wired a single pole switch.
____C62. Wired a three way switch.
____C63. Wired an outlet.
____C64. Replaced circuit breakers.

____C65. Replaced fuses.
____C66. Wired a 120 volt single pole circuit breaker.
____C67. Wired a 240 volt double pole circuit breaker.
____C68. Identified repair problems.
____C69. Selected equipment needed to repair specific problems.
____C70. Made repairs with the oxyacetylene rig to specifications.
____C71. Made repairs with the shielded metal arc welding outfit to specifications.
____C72. Matched terms associated with bearings, packings, and seals to their correct definitions.
____C73. Identified types of bearings.
____ 74. Listed types of bearing materials.
____C75. Listed reasons for bearing failure.
____C76. Removed bearings as specified.
____C77. Packed bearings to specifications.
____C78. Replaced bearings to specifications.
____C79. Replaced seal to specifications.

GENERAL INDUSTRIAL MAINTENANCE II

Student: _____

This record is provided as an alternative to the student performance records at the end of each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

Place a check by each objective the student achieved; you may wish to note the date that the student achieved the objective.

C = Core competencies.

____ C1. Listed general shop safety rules.
____ C2. Listed personal safety rules.
____ C3. Listed the colors of the federal safety code and purpose of each.
____ 4. Matched terms associated with plumbing materials to their correct definitions.
____ C5. Selected from a list types of materials used in plumbing pipes.
____ C6. Selected from a list types of pipes used in plumbing.
____ C7. Matched types of copper pipe with their correct identification colors.
____ C8. Distinguished between black steel and galvanized steel pipe.
____ 9. Listed advantages and disadvantages of plastic (PVC) pipe.
____ 10. Matched materials used to make plumbing fittings with their specific uses, types and properties.
____C11. Identified basic plumbing fittings.
____C12. Matched terms and definitions associated with plumbing tools.
____ 13. Matched types of plumbing tools to their uses.
____C14. Cut and threaded pipe to specifications.
____C15. Sweated copper fittings.
____C16. Cut, reamed, and joined plastic pipe.
____C17. Matched terms associated with rigging and hoisting to their correct definitions.
____C18. Identified types of hand signals.
____C19. Identified accessories used for load lifting.
____C20. Identified hitches used for attaching materials and equipment to the hoist.
____C21. Identified types of knots used in rigging.
____C22. Listed safety tips related to rigging and hoisting.

____C23. Described a safety latch.
____C24. Changed out motor using portable hoist.
____ 25. Defined terms associated with unloading, uncrating and inspection.
____C26. Listed steps to take to prevent damage when unloading equipment.
____C27. Listed steps to take after equipment has been unloaded.
____C28. Listed items to look for when receiving equipment.
____C29. Unloaded equipment using hoist.
____C30. Uncrated materials as specified.
____C31. Inspected equipment or materials for shipping damage as specified.
____C32. Inventoried shipping list as specified.
____C33. Matched terms associated with setting equipment to their proper definitions.
____C34. Listed uses of anchor bolts and bedplates when securing equipment.
____C35. Listed vibration and noise control materials.
____C36. Identified types of machine mounts.
____ 37. Explained the purpose of machine mounts.
____C38. Explained what is usually the most important operation in machinery installation.
____C39. Set electrical motor to specifications.
____C40. Matched terms associated with pumps to their correct definitions.
____ 41. Listed types of pumps.
____ 42. Listed standard pump ratings in general use.
____ 43. Listed types of anchors used for pump installation.
____C44. Listed steps to follow when installing a pump.
____C45. Matched terms associated with compressors to their correct definitions.
____C46. Listed steps to follow when installing a compressor.
____C47. Set, aligned, and leveled a compressor.
____C48. Matched terms associated with gear boxes and speed reducers to their correct definitions.
____C49. Identified basic types of gear boxes and speed reducers.
____C50. Listed uses of variable speed drives.
____C51. Identified types of lubricators.
____C52. Diassembled gear box.
____C53. Cleaned gear drive.
____C54. Reassembled gear box.
____C55. Lubricated gear box.
____C56. Matched terms associated with bearings, packings, and seals to their correct definitions.
____C57. Identified types of bearings.
____ 58. Listed types of bearing materials.
____C59. Listed reasons for bearing failure.
____C60. Removed bearings as specified.

____C61. Packed bearings to specifications.
____C62. Replaced bearings to specifications.
____C63. Replaced seal to specifications.